Five -Year Review Report

Second Five -Year Review Report

for

Liquid Disposal incorporated

Rochester Hills

Macomb County, Michigan

September, 2003

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9/26/03

Five-Year Review Report

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List of Acronyms

ACRONYM	NAME OR TERM
ARARs	Applicable or Relevant and Appropriate Requirements
CERCLA/SARA	Comprehensive Environmental Response, Compensation and Liability Act/Superfund Amendments and Reauthorization Act of 1986 (Superfund)
CD	Consent Decree
COC	Contaminant of Concern
ESD	Explanation of Significant Difference
FS	Feasibility Study
GSI	Groundwater Surface Water Interface
LDI	Liquid Disposal Incorporated
MCL	Maximum Contaminant Level
MDNR	Michigan Department of Natural Resources
MDEQ	Michigan Department of Environmental Quality
MW-	Monitoring Well
ND	Non Detect
NPL	National Priorities List
O&M	Operation and Maintenance
PCOR	Preliminary Close Out Report
RAP	Remedial Action Plan
ROD	Record of Decision
RD/RA	Remedial Design/Remedial Action
RI	Remedial Investigation
RPM	Remedial Project Manager
TBC	To Be Considered
TCL	Target Cleanup Levels
U.S. EPA	United States Environmental Protection Agency
VAS	Vertical Aquifer Sampling
VOC	Volatile Organic Compound

Executive Summary

The purpose of a statutory five-year review is to evaluate whether a completed remedial action remains protective of human health and the environment where hazardous waste remains on-site at levels that do not allow for unlimited use and unrestricted exposure. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and identify recommendations to address them.

U S. EPA conducted this second statutory five-year review under Section 121 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Contingency Plan (NCP). The next five year report is due by September, 2008.

The LDI Site remedy is protective of human health and the environment.

This review will be placed in the Site files and local repository for the Liquid Disposal, Inc. Superfund Site in Shelby Township, Michigan.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name *(from WasteLAN)*: Liquid Disposal Incorporated		
EPA ID *(from WasteLAN)*: MID067340711		
Region: 5	**State:** MI	**City/County:** Utica, Macomb County
SITE STATUS		
NPL status: X Final ☐ Deleted ☐ Other (specify)		
Remediation status (choose all that apply): ☐ Under Construction X Operating ☐ Complete		
Multiple OUs?* ☐ YES X NO	**Construction completion date:** 8 /15/1996	
Has site been put into reuse? ☐ YES X NO		
REVIEW STATUS		
Lead agency: X EPA ☐ State ☐ Tribe ☐ Other Federal Agency		
Author name: Kenneth Glatz		
Author title: Remedial Project Manager	**Author affiliation:** Superfund RRB-2, Section 6	
Review period:** 2/23/1998 to 2/23/2003		

Date(s) of site inspection: U.S. EPA and MDEQ in 3/2001, 10/2001, and 2/2002 in conjunction with supplemental S[illegible] studies.	
Type of review:	X Post-SARA ☐ Pre-SARA ☐ NPL-Removal only ☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead ☐ Regional Discretion
Review number: ☐ 1 (first) X 2 (second) ☐ 3 (third) ☐ Other (specify)	
Triggering action:	☐ Actual RA Onsite Construction at OU #____ ☐ Actual RA Start at OU#____ ☐ Construction Completion X Previous Five-Year Review Report ☐ Other (specify)
Triggering action date ***(from WasteLAN)*****:** 2 /23/1998	
Due date ***(five years after triggering action date)*****:** 2 /23/2003	

Issues:

The first five-year review recommended deletion of the Site from the NPL when the required inward hydraulic gradient across the slurry wall was reached, and the groundwater quality reached the ROD cleanup standards. At the time of the first five-year review there had been satisfactory progress toward establishing the inward gradient. Since that time we have determined that the slurry wall has not completely isolated the waste material from the surrounding ground water. Combined with the small amount of discharge that can be obtained from the extraction wells inside the slurry wall, this lack of hydraulic isolation has prevented attainment of an "effective"inward gradient. There is no evidence that contaminants are leaving the Site, as determined by supplemental VAS studies conducted by the PRPs in the fall of 2001 at several locations downgradient of the slurry wall, even though several wells inside the slurry wall contain COCs well above MCLs. Downgradient well MW-111 contained benzene at 14 ppb in the March 2003 sampling event. However the contamination at MW-111 has historically been in this range, and it appears to be a stagnant zone of localized contamination.

Studies by the PRPs in 2002 indicate that biodegradation continues to lower organic contamination both inside and outside the slurry wall. Except for barium contamination just above MCLs at MW-103 O (sidegradient, outside southwest corner of slurry wall), and Benzene at MW- 111, the down gradient groundwater currently meets the target cleanup levels listed in the ROD/ESD. Barium is a naturally occurring contaminant at the Site at about 1000 ppb background level, and the statistical evidence indicates a decreasing trend for barium across the Site.

Recommendations and Follow-up Actions:

- The groundwater monitoring plan was expanded to include more information about the chemical content of the wells inside the slurry wall, and to insure that biodegredation continues to occur at a sufficient rate so that MCL goals will be achieved in a reasonable time frame. These revisions were implemented in the December 2002 sampling event. The chemical data will continue to be statistically analyzed by the CarStat program to insure chemical concentrations continue to decrease.

- Recent extraction well pumping studies show 85% of the extractant coming from three relatively non contaminated wells. The well logs of all fourteen extraction wells will be studied to see if the extraction rates are consistent with the hydraulic conductivity and/or specific capacity determined for each well. If inconsistences are found, well rehabilitation methods will be improved. This work will be negotiated with the PRPs in 2004.

- U.S. EPA has requested the PRPs develop/suggest methods to obtain the inward gradient. The PRPs have argued that the inward gradient is not necessary based on the lack of measured contamination outside the slurry wall. U.S. EPA will decide what additional remedial activity is necessary, if any, to achieve the inward gradient. Installation of a collection trench to augment the extraction wells has been suggested by MDEQ. A second ESD should be considered if the inward gradient is determined to be technically impracticable (TI) and unnecessary to the overall protectiveness of the remedy. Monitoring of the aquifer outside the slurry wall will continue to occur until the inside of the slurry wall achieves MCLs concentrations. This would confirm that no contamination is leaving the Site.

Protectiveness Statement:

The remedy is expected to be fully protective of long term human health and the environment upon attainment of groundwater cleanup goals. The assessment of this five-year review found that the remedy was constructed in accordance with the Record of Decision and the Explanation of Significant Differences. Capping of the contaminated soils has removed the possibility of human contact and institutional controls are in place that restrict use of land and groundwater. Although the remedy included the establishment of a specific inward gradient from the extraction wells operating within the prescribed slurry wall, this inward gradient has not been achieved to date. Nonetheless, natural processes as described in the ESD are occurring, with only two contaminants of concern exceeding MCLs in water tested sidegradient/downgradient of the Site. Because there continues to be a "lack of realistic potential for human exposure to off-site groundwater and a lack of demonstrable ecological risk from off-site groundwater. . . ," as indicated in the ESD (p.5), natural attenuation processes and ground-water extraction from within the slurry wall, together with continued monitoring, will continue to provide protectiveness to human health and the environment until the goals are met.

Five-Year Review Report

I. Introduction

The Purpose of the Review

The purpose of a statutory five-year review is to evaluate whether a completed remedial action remains protective of human health and the environment at sites where hazardous waste remains on-site at levels that do not allow for unlimited use and unrestricted exposure. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and identify recommendations to address them.

Authority for Conducting the Five-Year Review

U. S. EPA is preparing this Five-Year Review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121 and the National Contingency Plan (NCP). CERCLA Section 121 states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgement of the President that action is appropriate at such site in accordance with section 104 or 106, the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

U.S. EPA interpreted this requirement further in the NCP; 40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii) which states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for the unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

Who Conducted the Five-Year Review

Mr. Kenneth Glatz, RPM, U.S. EPA Region 5, performed this five-year review. The Five-Year

Review was based, in part, on several inspections conducted at the Site since the first five-year review. In addition the Project Manager reviewed documents, including the ROD, the first Five-Year Review Report, results of supplemental studies conducted at the Site, data from quarterly monitoring events and the statistical evaluation of this data. U.S. EPA completed this second Five-Year Review based upon the information obtained from these sources and activities.

Other Review Characteristics

This is the second five-year review for the LDI Site. The triggering action for this review is the completion of the first Five-Year Review of February 1998.

II. Site Chronology

Event	Date
Initial Discovery	May-June 1982
Site Security installed, lagoons modified	August-December 1983
Pre-NPL Response	Removals: May-July 1982 July-September 1982
NPL Listing	September 8, 1983
Removal Actions	April 1983-April 1984 July 1985-April 1986
RI/FS	April 1983-September 1987
ROD	September 30, 1987
CD	December 20, 1989
RD Start/Complete	August 1989-September 1992
RA Start	December 1992
ESD	August 28, 1995

Construction Completion	August 15, 1996
PCOR	September 15, 1997
Five-Year report	February 23, 1997
Two year performance evaluation	October 2000
Re-Construct wetlands	Spring 2000
Supplemental Studies	2001-Present

III. Background

Physical Characteristics

The Site is located in Shelby Township, Macomb County, Michigan, about 3 miles northwest of Utica and 20 miles north of Detroit. The Site occupies approximately 6.8 acres of land and is bordered by the Clinton River floodplain 1/4 mile to the north, the Shadbush Tract Nature Study Area on the east, A&A auto salvage yard to the south and a recreational vehicle storage area to the west.

Land and Resource Use

There is no human use or exposure of groundwater to humans in the area surrounding the Site. No groundwater wells are affected or threatened by the Site. Previous uses of the Site include sand and gravel mining and land filling. The floodplain area to the north of LDI serves as the Rochester-Utica State Recreational Area. This area is used for fishing, picnicking, boating and hiking. Prior to the ESD being issued, an Ecological Risk Assessment confirmed that off-site groundwater contamination levels were not high enough to produce a negative ecological impact.

History of Contamination

In 1968 a liquid industrial waste incinerator, LDI began operation at the Site. Wastes received included PCBs, solvents, paints, laboratory wastes and various contaminated soils and wastes for incineration. Prior to incineration, wastes were stored in above ground and subsurface bulk storage tanks, drums, lagoons, and bottles. Numerous citations for violations were issued to the facility by the MDNR, now the MDEQ. LDI ceased operation on January 13, 1982 following the death of two people in an on-site industrial accident.

Initial Response

The Site was proposed for the National Priorities List (NPL) on July 16, 1982 and finalized on September 9, 1983. During the period of 1982 through 1986, U.S. EPA performed four major removal actions at the Site, including removal of 1.3 million gallons of liquids; 15,000 cubic yards of solids; 1,800 drums and 30 storage tanks. The MDNR performed the Remedial Investigation/Feasibility Study, which was finalized in 1987. The RI concluded that soils and other materials remaining on-site were still contaminated with a wide variety of organic and inorganic chemicals. For example, in the former waste oil lagoon area, total organic compounds reached 17,332 mg/kg, mainly volatile aromatics, with xylenes most prevalent. In the scrubber lagoon area, Arochlor-1254 (a PCB) reached 69 mg/kg, cadmium 83 mg/kg and lead 9,910 mg/kg. Off-site groundwater was found to be contaminated with a similar variety of compounds. Nearly all individual organics were found at levels less than 40 ug/l. Exceptions include acetone at 490 ug/l and 4-methyl-2-pentanone at 99 ug/l. Of the inorganics, only barium significantly exceeded drinking water standards, at 3,900 ug/l.

MDNR Surface Water Quality Division conducted a study in 1986 to access the impact of the Site on the Clinton River. The results indicated no discernible impact on the aquatic life of the river.

Basis for Taking Action

The contaminants in the on-site soils led to a Hazard Index of 74.4 for direct contact by children and a maximum potential carcinogenic health risk of 1×10^{-6}. The contaminants in off-site groundwater led to a Hazard Index of 13.7 for ingestion by child or adult and a maximum potential carcinogenic risk of 1×10^{-5}.

IV. Remedial Actions

Remedy Selection

The remedial action goals of the ROD were to minimize risks to public health and the environment from direct contact with contaminated materials; to minimize further migration of contaminants to groundwater and surface water, and to clean up any contaminants that may have already migrated off-site. A ROD was signed for the Site on September 30, 1987, which required:

* Demolition of structures and equipment on-site;

* Consolidation of soil and debris on-site; Removal and consolidation of off-site soils above target cleanup levels with on-site soils; and solidification using cement or a similar substance down to the water table to immobilize wastes in the soil;

* Construction of a slurry wall around the Site to restrict migration of groundwater onto or off of the Site;

* Construction of an impermeable cap over the Site to impede infiltration;

* Installation and operation of leachate extraction wells inside the slurry wall to remove groundwater trapped on-site under the cap and any groundwater entering the Site through the cap or slurry wall in the future; disposal of the groundwater off-site;

* Installation and operation of extraction wells off-site to capture and treat any groundwater contamination which may have migrated off-site.

The Remedial Design and Remedial Action were performed by a PRP group pursuant to a Consent Decree, United States v. BASF Wyandotte Corp. et al., No. 89-CV-71180-DT (E.Dist., So. Div. MI), entered on December 20, 1989. Under this consent decree, 41 major PRPs, and 494 de minimis PRPs agreed to fund and to perform the remedial action. Additional funding for the remedial action came from another 325 de minimis parties who settled with the United States in a consent decree entitled United States v. A.N. Reitzloff Co., et al., No. 90-CV-71414-DT (E.Dist., So. Div. MI), which was entered in August 1990.

New information received during the Remedial Design phase led U.S. EPA to review the selected remedy for treatment of off-site groundwater and for total Site solidification. Based on this new information, U.S. EPA concluded that the remediation of off-site groundwater envisioned by the ROD had occurred and was continuing to occur through natural processes. An Ecological Risk Assessment confirmed that off-site groundwater contamination levels were no longer high enough to produce a negative ecological impact. Taking into consideration the extensive removal work at the Site and the improved state of off-site groundwater, U.S. EPA determined that total Site solidification and extraction and treatment of off-site groundwater were no longer necessary. U.S. EPA issued a fact sheet and held a public meeting to give the public the opportunity to comment on the proposed changes.

On August 28, 1995, U.S. EPA issued an Explanation of Significant Difference to document the following modifications to the ROD:

* Groundwater extraction off-site will not be implemented unless U.S. EPA finds that off-site groundwater quality has deteriorated as a result of site-related contamination.

* Rather than total Site solidification, all highly contaminated soils and materials

encountered during remedial activities would be contained and solidified on-site and a solidified 20 foot-wide swath (down to the clay layer) will be constructed around the perimeter of the Site.

Remedy Implementation

On-site construction began December 7, 1992. The following activities were conducted:

* Demolition of structures and equipment on Site;

* Removal of off-site soils and consolidation with on-site soils;

* Solidification of a 20 foot-wide swath of perimeter Site soil and of selected other areas of highly contaminated soil and debris on-site;

* Construction of an in-situ slurry wall around the Site;

* Construction of an impermeable cap over the Site; and

* Installation and operation of leachate extraction wells inside the slurry wall.

U.S. EPA and the State conducted a pre-final inspection on August 15, 1996, which included a description and schedule for correcting remedial action items by the contractor. These items included demonstrating the integrity of the slurry wall and improving the groundwater extraction system inside the slurry wall. These items were completed in August 1997 and U.S. EPA conducted a follow-up inspection on September 4, 1997. In a Preliminary Closeout Report (PCOR) dated September 15, 1997, U.S. EPA determined that the Remedial Action activities were completed. Follow-up items identified in the PCOR were:

* Submittal of Construction Completion Report and final Operation and Maintenance Plan by the PRP group;

* Continued operation and maintenance by the PRP group, including cap maintenance, internal groundwater extraction and off-site disposal, on and off-site groundwater monitoring, and monitoring of revegetated areas.

The Construction Completion Report was received on August 15, 1996.

System Operation/Operation and Maintenance

The final Operation and Maintenance Plan (revision 4) was approved on March 30, 2000. The O&M plan calls for quarterly chemical monitoring and groundwater elevation

measurements of upgradient wells, downgradient wells, and of select wells within the slurry wall.

V. Progress Since the Last Five-Year Review

The first five-year review indicated progress toward the inward gradient. Since 1998 no additional progress toward the inward gradient has been achieved. U.S. EPA requested three supplemental studies be conducted to determine what effect this was having on the ground water quality down gradient of the slurry wall.

1. A series of six VAS wells were installed in the fall of 2001 north and northeast of the slurry wall to detect any contamination in the areas of the suspected voids in the slurry wall. No COCs were detected above MCLs at any of these VAS locations. This study also established that a natural clay barrier existed on the north and northeast sides of the slurry wall, which severely limits any escape of contaminants from the landfill through the slurry wall.

2. A study was conducted to determine and compare the water elevation and pumping rates from all fourteen extraction wells within the slurry wall. This study indicated that over eighty five percent of the extracted water was coming from three of the least contaminated wells. It also showed that the extraction wells nearest the slurry wall (EW-1 thru EW-7) had met the inward gradient but that outward gradients were indicated in the monitoring wells near the slurry walls throughout most of the Site. This indicates that water flow patterns/flow channels within the slurrywall is poor, and recharge to most of the extraction wells is restricted. This is not unexpected for an industrial/commercial/municipal landfill, which LDI was in its early history. The well logs of all fourteen extraction wells will be studied to see if the extraction rates are consistent with the hydraulic conductivity/specific capacity determined for each well. If inconsistences are found, well rehabilitation methods will be improved This work will be negotiated with the PRPs in 2004.

3. Two wells outside the slurry wall, MW-111 and MW-105 O, were also investigated in 2003 to determine if they could be incorporated into the extraction system. These two wells have consistently had contamination of VOCs above MCLs. MW-111 is just outside the north slurry wall. Benzene content at MW-111 is persistent at the mid teen concentration level, but declining. MW-105 O is south of the south slurry wall and upgradient of the Site. Three VAS studies were conducted near well MW-105 O to identify whether it is in an upgradient COC source area. It was not. All three VAS locations showed VOCs. At least one VOC was above MCLs in two of the locations. The source of this contamination is not known. The ROD indicated that upgradient contamination was present and noted "The slurry wall/cap system will also protect the solidified soil/waste from degradation by upgradient ground water that is slightly contaminated with chemicals not attributable to the LDI Site". The VAS study indicates that the contamination is localized, and there is no evidence that the contamination is migrating,

and that it is probably a localized static area of contamination. Neither MW-111 or MW-105 O locations are amenable to be converted to extraction wells because of the poor recharge characteristics of each well. Except for barium contamination just above MCLs sidegradieht at MW-103 O, and Benzene down gradient at MW- 111, the groundwater currently meets the target cleanup levels listed in the ROD/ESD. The statistical evidence indicates that both Barium and Benzene levels are declining over time.

VI. Five-Year Review Process

Administrative Components

This Five-Year Review is based upon the first Five-Year Review Report prepared by U.S. EPA, the Site inspection activities performed by U.S. EPA and MDEQ, supplemental studies and quarterly monitoring events.

Community Involvement /Interviews

In February 2003, the Director of the Office of Emergency Management and Communications for Macomb County, was contacted by the MDEQ to inform him that the five-year review process had been initiated. He indicated that there had been no inquiries by private citizens or adjacent property owners in regard to the Site, but that an update meeting would be beneficial. On April 1, 2003, MDEQ gave a presentation to approximately 50 people. The MDEQ answered many questions concerning the past practices at the Site and possible future emergency problems. MDEQ recommended that people contact MDEQ with any further questions of concerns. To date no inquiries or comments have been received.

Document and Data Review

The documents and data reviewed in preparing for this Five-Year Review Report are listed in the attachment entitled "List of Documents Reviewed".

VII. Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

There has been a statistically significant decrease in all COCs above MCLs in most wells since the initiation of O&M. The remedy implemented for the Liquid Disposal, Inc. Site complies with the performance standards selected in the ROD and ESD, and ARARs. The U.S. EPA believes that the clay cap over the Site and the slurry wall surrounding the Site comply with all

performance standards and ARARs. The cap complies with RCRA Subtitle C and 40 CFR Part 264, and with the Michigan Hazardous Waste Management Act (Act 64). The cap will prevent significant amounts of water from infiltrating into the Site and will protect against direct contact with the remaining wastes.

The ROD also required the installation of a leachate extraction system within the Site. The approved RAP for the Site specifies that the extraction system be sufficient to establish and maintain an inward differential in groundwater levels across the slurry wall. Initially the modified extraction system was making satisfactory progress toward this differential; however since 1998 no further progress toward the inward gradient has been made. The extraction rate has stabilized at 5000 gallons per week. Iron bacteria is known to clog the extraction well screens, but even after many approved acid treatments of the extraction wells, there has been no further progress toward the inward gradient. The extracted groundwater is pumped automatically to a 5,000 gallon tank, which is pumped out and trucked off-site for disposal on average once a week. The tank contents are non-hazardous. Groundwater contour maps indicate that the slurry wall is not keyed into the clay base, and there is hydraulic communication through the wall at several locations. However VAS studies immediately down gradient of the Site indicates that chemicals are not migrating off-site at a sufficient rate or concentration to pose a risk to human health or the environment.

The cleanup standards in the ROD and ESD remain adequate to protect groundwater and surface water. The ROD/ESD established TCLs at the Maximum Contaminant Level (MCL) or background level, whichever is higher. For contaminants for which there was no MCL available at that time, the TCL was set at a risk level of 10^{-6} for carcinogens or a Hazard Index of 1 for non-carcinogens. Some elevated background concentrations were acknowledge in the ROD, especially for VOCs. The following table shows the contaminants and TCLs which were listed in the ROD, the current MCLs, and the current contaminant levels:

Analyte	ROD TCL (ug/l)	Current MCL (ug/l)	Down gradient (ug/l)
barium	1000	2000	2730 (MW-103 O)
cadmium	10	5	ND
chloroform	0.1	100	ND
benzene	0.2	5	14 (MW- 111)
methylene chloride	1	5	ND
trichloroethylene (TCE)	0.8	5	ND

Except for barium (at MW-103 O) sidegradient on the south west side of the slurry wall, and Benzene at MW- 111 (down gradient), groundwater at the Site currently meets MCLs and the target cleanup levels listed in the ROD and modified in the ESD. Statistical analysis of chemical monitoring data (CarStat program) indicate decreasing trends for all COC chemicals, even those currently below MCLs. The CarStat statistical analysis indicates that barium levels

are declining also, and are only slightly above MCLs at MW-103 O. A report submitted in October 1996 by the PRP group confirms that natural attenuation, mainly as biodegredation, continues to effectively lower organic contaminant levels down gradient of the Site. Recent studies conducted inside the slurry wall also indicate that biodegration continues to lower the organic contamination.

Groundwater at the Site is not being used as a source of drinking water and is not likely to be used in the future because the land between the Site and the groundwater discharge point at the Clinton River is part of the Rochester-Utica Recreation Area and the Shadbush Tract Nature Study Area. The groundwater discharge at the Clinton River meets the surface water quality standards of the ROD and current standards. Three select wells near the Clinton river have been sampled twice since the last five year review, the last by MDEQ on December 20, 2000. There were no VOCs above MCLs in either sampling event. The standards are protective of human health and the environment.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

Changes in Standards and To Be Considered Criteria

The State has indicated that chloride (and possibly zinc) levels in the groundwater at several monitoring locations at the Site are above State GSI criteria. U.S. EPA currently is reviewing whether the GSI criteria for these compounds are applicable or relevant and appropriate to the remedy at the Site because chloride and zinc are not contaminants of concern for the Site, nor is exposure to these compounds at the concentrations detected, current environmental or health based risks posed by the Site. U.S. EPA will review the issue of whether the GSI is applicable or relevant and appropriate for the Site. If found to be an ARAR, the monitoring plan would be revised accordingly. There are no other standards identified in the ROD/ESD which have been revised, no newly promulgated standards and no TBCs used in selecting the cleanup levels at the Site that have changed and could affect the protectiveness of the remedy.

Changes in Exposure Pathways

There have been no changes in the potential exposure pathways at the Site since the implementation of the remedy for the Site. There have been no land use changes at the Site nor are any expected in the near future.

Changes in Toxicity and Other Contaminant Characteristics

Neither the toxicity factors for the contaminants of concern nor other contaminant characteristics have changed in a way that could affect the protectiveness of the remedy.

Changes in Risk Assessment Methods

Standardized risk assessment methods have not changed in a way that could affect the assessment of the protectiveness of the remedy.

Expected Progress Toward Meeting Remedial Action Objectives

The remedy for the Site is progressing through extraction of contamination from within the slurry wall, and through natural processes, primarily bioremediation. Progress toward the Remedial Action Objectives continue to be made at the Site. The monitoring programs will continue to ensure that any changes in contaminant levels, on or downgradient off-site will be detected and addressed if necessary. U.S. EPA will continue to seek a process for establishing the inward gradient, or deal with the possibility that the inward gradient is technically impractible to establish. In that event an ESD will be considered to change this requirement. Statistical analysis indicates that contaminant trends are decreasing for all COCs.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

There have been no newly identified human health or ecological risks, impacts from natural disasters, or any other information that has been identified that could affect the protectiveness of the remedy for the Site. However, as noted, the volume encompassed by the site slurry wall has not achieved the inward hydraulic gradient that is implied in the ROD and ESD. This could in the future negatively affect the protectiveness of the remedy.

VIII. Issues

At issue is whether the inward gradient can be established between the groundwater and inside the slurry wall. At the time of the first five-year review there had been satisfactory progress toward establishing the inward gradient. Since that time we have determined that the slurry wall has not completely isolated the waste material from the surrounding ground water. Combined with the small amount of discharge that can be obtained from the extraction wells inside the slurry wall, this lack of hydraulic isolation has prevented attainment of an inward gradient. There is no evidence that contaminants are leaving the Site, as determined by supplemental VAS studies conducted by the PRPs in the fall of 2001 at six locations downgradient of the slurry wall, even though several wells inside the slurry wall contain COCs well above MCLs.

Downgradient well MW-111 contained benzene at 14 ppb in the March 2003 sampling event. However the contamination at MW-111 has historically been in this range, and it appears to be a stagnant zone of localized contamination. Studies by the PRPs in 2002 indicate that biodegradation continues to lower organic contamination both inside and outside the slurry wall.

Except for barium contamination just above MCLs at MW-103 O, and Benzene at MW- 111, the down gradient groundwater currently meets the target cleanup levels listed in the ROD/ESD. Barium is a naturally occurring contaminant at the Site at about 1000 ppb background level, and the statistical evidence indicates a decreasing trend for barium across the Site.

The State has indicated that chloride levels (and possibly zinc) in the groundwater at several locations at the Site are above State GSI criteria. U.S. EPA currently is reviewing whether the GSI criteria for these compounds is applicable or relevant and appropriate to the remedy at the Site because these compounds are not contaminants of concern for the Site, nor is exposure to these compounds a current environmental or health based risk posed by the Site. If the criteria for these compounds are determined to be ARARs, the monitoring plan would be revised accordingly.

IX. Recommendations and Follow-Up Actions

- Continued maintenance of the clay cap and a re-evaluation of the leachate extraction system are recommended. The well logs of all fourteen extraction wells will be studied to see if the extraction rates are consistent with the hydraulic conductivity/specific capacity determined for each well. If inconsistences are found, well rehabilitation methods will be improved. This work will be negotiated with the PRPs in 2004.

- The O&M plan needs to be upgraded to include monitoring at several additional wells inside the slurry wall.

- The PRPs have been requested to continue to provide evidence of bioremediation inside and outside the slurry wall, based on the evaluation of MNA parameters. In addition the chemical monitoring data should continue to be statistically analyzed by the U.S. EPA (CarStat program) to insure chemical concentrations are decreasing.

- U.S. EPA will continued to seek a process for establishing the inward gradient, or deal with the possibility that the inward gradient is technically impractible to be established. In that event an ESD will be considered to change the inward gradient requirement.

- The Site should be delisted when the groundwater inside and downgradient of the slurry wall meet MCLs.

- U.S. EPA is currently is reviewing whether the GSI criteria for chloride (and zinc) are applicable or relevant and appropriate to the remedy at the Site. If the criteria for these compounds are determined to be ARARs, the monitoring plan would be revised accordingly.

This review will be placed in the Site files and local repository for the Liquid Disposal, Inc. Superfund Site in Shelby Township, Michigan.

X. Protectiveness Statement

The remedy is expected to be fully protective of long term human health and the environment upon attainment of groundwater cleanup goals. The assessment of this five-year review found that the remedy was constructed in accordance with the Record of Decision and the Explanation of Significant Differences. Capping of the contaminated soils has removed the possibility of human contact and institutional controls are in place that restrict use of land and groundwater. Although the remedy included the establishment of a specific inward gradient from the extraction wells operating within the prescribed slurry wall, this inward gradient has not been achieved to date. Nonetheless, natural processes, as mentioned in the ESD is occurring, with only two contaminants of concern exceeding MCLs in water tested sidegradient/downgradient of the Site. Because there continues to be a "lack of realistic potential for human exposure to off-site groundwater and a lack of demonstrable ecological risk from off-site groundwater. . . ," as indicated in the ESD (p.5), natural processes and ground-water extraction from within the slurry wall, together with continued monitoring, will continue to provide protectiveness to human health and the environment until the goals are met.

XI. Next Five-Year Review

The next five-year review will be conducted by September, 2008, which is five years from this review.

TABLE 1

List of Documents Reviewed

1. Record of Decision, Liquid Disposal Incorporated, U.S. EPA, September 30, 1987.

2. Quarterly Reports for Groundwater Quality and Hydraulic Monitoring, prepared by O & M, Inc. on behalf of The Liquid Disposal, Inc (LDI) Executive Committee from 1999 to June, 2003.

3. Explanation of Significant Difference, Liquid Disposal Incorporated, U.S. EPA, August 28, 1995.

4. Preliminary Close Out Report, Liquid Disposal, Inc. U.S. EPA, September 15, 1997.

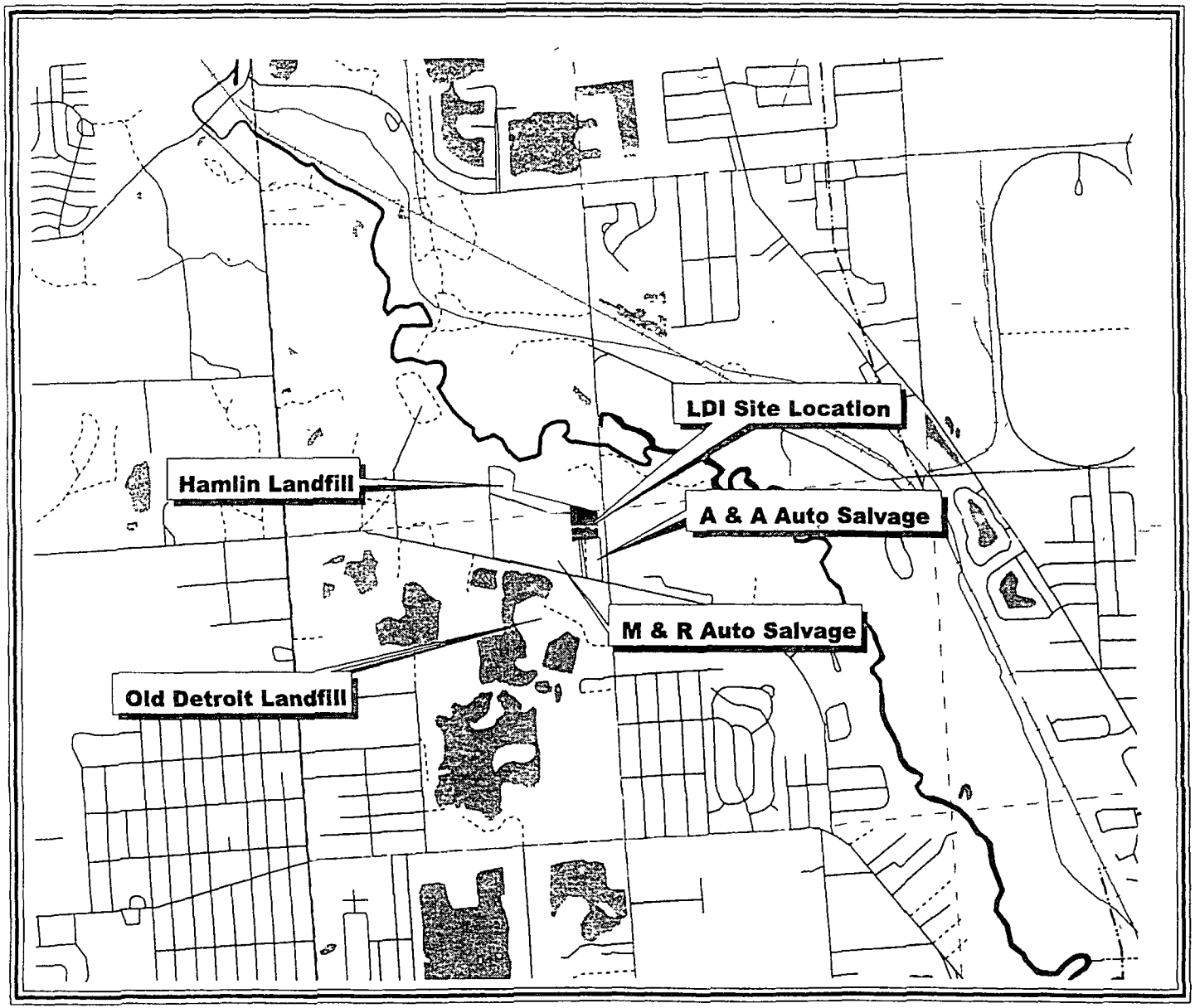
5. Five-Year Review Report, Liquid Disposal Incorporated, U.S. EPA, February 23, 1998.

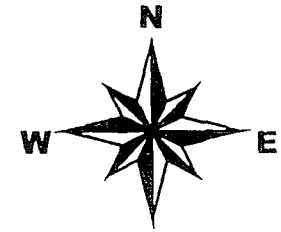
6. Liquid Disposal, Inc., Statistical Analysis Report, U.S. Department of Transportation, VOLPE Center, September, 2002. (Data from 4/28/1992 thru 3/28/2001).

7. Focused Groundwater Quality Investigation at MW-105 O, LDI Superfund Site, CRA, June, 2003.

8. MW-111 Pumping Test Results, LDI Superfund Site, CRA, June, 2003.

Figure 1
Site Location With Adjacent Land Use Map





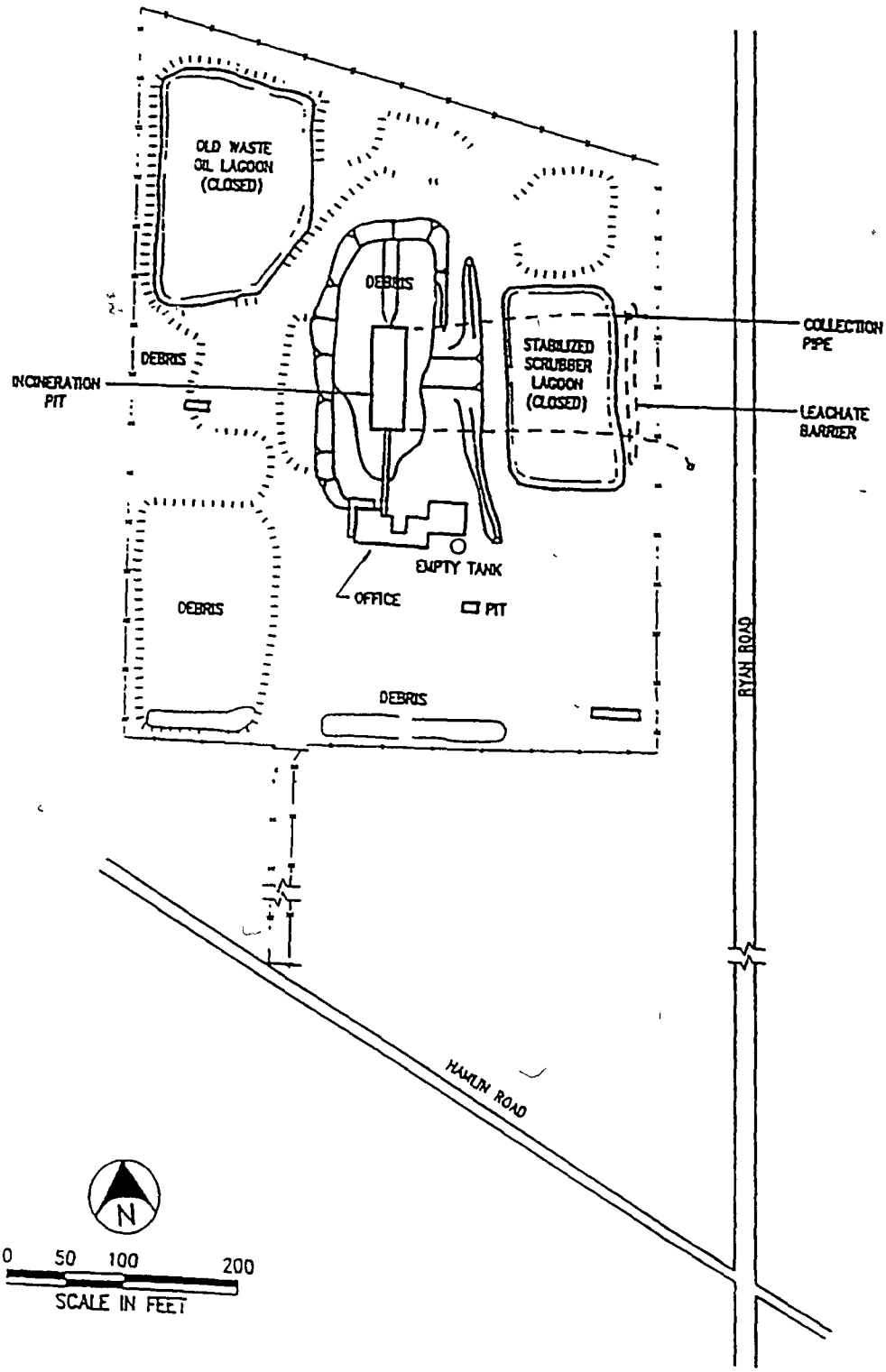
DEQ

Michigan Department of Environmental Quality
Remediation and Redevelopment Division
Superfund Section
Site Evaluation Unit
Compiled by C.R.
July 2003

MIRIS Basemap,
DOQ, DEM, DRG Courtesy of
Michigan Center for Geographic Information

0.6 0 0.6 1.2 Miles

Figure 2
Site Features Map



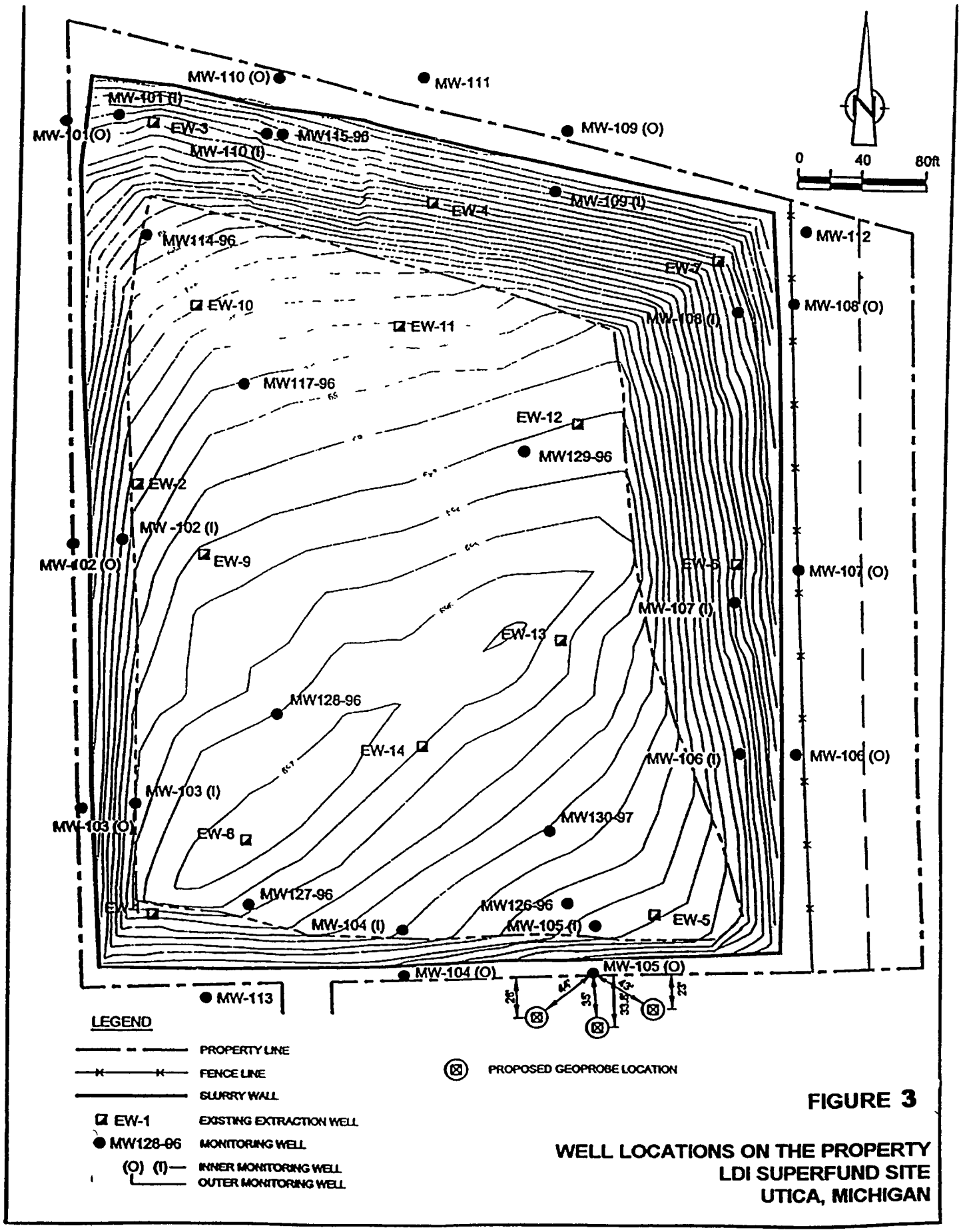


FIGURE 3

WELL LOCATIONS ON THE PROPERTY
LDI SUPERFUND SITE
UTICA, MICHIGAN

APPENDIX

September 30, 2002

Mr. Michael Percival
Alternate Project Coordinator
de maximis, inc.
1350 Parrott Trace
Greensboro, GA 30642

Re: Liquid Disposal, Inc. Superfund Site
Additional Work for the Liquid Disposal, Inc. Site

Dear Mr. Percival:

EPA has reviewed the data presented in the "Preliminary Results for the Groundwater Characterization Inside the Slurry Wall-LDI Superfund Site, Utica, Michigan" report dated March 14, 2002. On the basis of our review of the report, as well as other historical data, we remain concerned that there is a potential for contamination within the landfill slurry wall to migrate into the aquifer outside the slurry wall. Therefore, we are requesting that the Settling Defendants Group for the Site undertake additional work to further characterize and address areas of potential groundwater contamination, both inside and outside the slurry wall installed at the Site.

Hydraulic Connection Between Groundwater Inside and Outside the Slurry Wall

As EPA has indicated in previous letters and telephone conversations, and as the recent EPA kreging of the groundwater elevation data has shown, there is a hydraulic connection between the inside of the slurry wall and the outside groundwater at the north, south and east faces of the slurry wall. The exact locations of these connections are not known, but the groundwater contours suggest where these locations likely exist. Since the groundwater levels have remained essentially the same for several years, there is no indication of additional "failure" of the wall, and possibly the hydraulic connections have existed since completion of the slurry wall.

Although there is no evidence at this time of any major transfer of contaminants of concern (COCs) through the slurry wall that impacts the groundwater quality beyond close proximity to the Site, except possibly at MW-111, EPA remains concerned that such transfer could occur in the future at the points of hydraulic connection. EPA believes it is appropriate to take steps to ensure that Monitored Natural Attenuation (MNA), in conjunction with an enhanced extraction

system, continues to reduce contaminant levels and minimize the risk of contaminants that may migrate into the groundwater beyond the slurry wall.

Two Year Monitoring Program

Based on our review of the most recent data submitted in the March 2002 report, heavy contamination is noted at monitoring wells MW-107I, MW-108I, MW-117-96, MW-128-96 and MW-129-96. These wells need to be added to the monitoring system together with monitoring wells MW-105I, MW-109I and MW-110I. This will complete the spatial pattern of sampling points to adequately measure contamination inside the slurry wall. All wells identified above need to be included in the sampling program starting with the December 2002 sampling event.

The MNA data collected to date indicate, and EPA agrees, that biointrinsic remediation is occurring at several locations at the Site. EPA expects that a two-year program of quarterly chemical, and bi-annual MNA monitoring at the most highly contaminated locations inside the slurry wall, will provide sufficient data for the statistical evaluation of whether contaminant levels are dropping sufficiently inside the slurry wall to permit natural processes to replace the pump and treat ROD remedy (assisted by extraction/off-site disposal), or whether additional remediation is required. All of the above identified wells need to be added to the semi-annual MNA sampling, starting with the December 2002 sampling event. The MNA parameters include iron, manganese, sulfate, sulfite, nitrogen, carbon dioxide, ethane, ethylene, methane and dissolved organic carbon.

Increasing the Effectiveness of the Current Groundwater Extraction System

Sampling results from the March 2002 Report show that the relatively low contaminant levels in the collection tank do not reflect the high contaminated levels at extraction wells EW-10, EW-11, EW-13, and EW-14, suggesting that the highly contaminated wells are contributing only marginally to the removal of contaminants from within the interior of the slurry wall. Unfortunately the system is not currently designed to indicate the extraction rate from each of the extraction wells. The extraction at the highly contaminated locations needs to be improved.

Additionally, after review of the well installation data, it appears that some of the extraction wells are screened in the silt/clay layers that underlie the Site, and this may be limiting the effectiveness of groundwater extraction at these locations

EPA has outlined steps below to improve the effectiveness of the current extraction system.

Additional Work to Study Groundwater Extraction System

To address concerns regarding the effectiveness of the current groundwater extraction system, EPA requests that the Settling Defendants Group study the extraction system

design/performance within the next three months, for the purpose of installing new (or modify existing) extraction wells with properly located well screens, or of devising an alternate means of removing ground water from inside the slurry wall. This additional work will be comprised of the following:

(1) Prepare an interim report by January 15, 2002: This report should summarize the potential of the existing extraction system to be modified to improve the extraction rates in the highly contaminated areas of EW-10, EW-11, EW-13, and EW-14, and to include extraction at MW-107I, MW-108I, MW-117-96, MW-128-96, MW-129-96, MW-105O and MW-111 areas, or recommend alternate engineering provisions to accomplish this requirement (such as an extraction trench). The extraction rates at each of the extraction wells noted above must be established prior to the analysis of the existing system.

EPA reserves the right to modify this request to address the effectiveness of the remedy if the interim report concludes, and EPA agrees, that it is not technically feasible to effectively increase the extraction volume from within the slurry wall. As noted, the report should consider alternatives to modifying the existing system, and should recommend an alternative means of addressing groundwater contamination.

The report should contain a work plan, with schedule, for modifying/installing new extraction/monitoring wells, or for undertaking any other recommended engineered provisions. EPA will review and comment on this work plan.

(2) Construct the EPA approved modifications to the extraction/monitoring system: Within thirty days of receiving EPA approval on the proposed modification, the Settling Defendants Group will implement the approved modifications to the extraction/monitoring system, consistent with the approved schedule.

(3) Modify Operation and Maintenance Plan: The O&M plan will need to be modified to accommodate the changes made to the extraction/monitoring system. The O&M Plan must also indicate that each extraction well will be redeveloped when the extraction rate for that well falls to 75% of the base level. The new extraction well system will need to record the extraction rate for each well and this information should be totaled on a weekly basis, and reported in the monthly report. The modifications to the O&M Plan can be accomplished by issuing an addendum to the existing O&M Plan. The addendum to the O&M Plan should be provided to EPA within one month after the completion of the EPA approved extraction system modifications.

(4) Prepare Groundwater Extraction System Report: After the modified or new extraction/monitoring system has been in operation for a two year period, the Settling Defendants Group should prepare a report that summarizes the results of all site data (inside and outside the slurry wall). The report should include all analytical data, including MNA

parameters, (taken semi-annually at the monitoring wells), and should discuss whether the data indicates that natural processes, and the extraction of contaminants, is capable of preventing migration of contaminants off-site under current and potential future scenarios. Based on the results of this report, EPA will re-evaluate if further remedial action is required.

If contamination appears to be moving outside the slurry wall, based on data from the quarterly monitoring events, EPA will request that the Settling Defendants Group take appropriate steps to prevent migration of contaminants outside the slurry wall into the aquifer.

While we have discussed these points in general, I am available to discuss these points in more detail. I would like to set up a conference call with you within the next two weeks. I will call you to schedule a conference call. Please do not hesitate to call me if you have questions in the meantime. I can be reached at (312) 886-1434

Sincerely,

Kenneth Glatz, P.E.

cc Barbara Wester ORC
Sunny Krajcovic MDEQ
Bob Kay
Matt Mankowski
Susan Schneider DOJ